Report No.:SZ11100091W03

FCC Part 15C TEST REPORT

TESTING
CNAS L3572

Issued to

Goodbetterbest Limited

For

EX-05 MILITARY STYLE HEADSET CRISP&

DEEP WIRELESS STEREO HEADPHONES

Model Name	:	EX5UNI-21
Trade Name	:	N/A
Brand Name	:	Gioteck
FCC ID	:	VS9-EXTX
Standard	:	FCC Part 15 Paragraph 15.249
Test date	:	2011-11-10 to 2011-11-30
Issue date	:	December 6, 2011

by

Shenzhen MORLAB Communication Technology Co., Ltd.

Tested by Zhang Yan	*Approved by* Wei Yanquan	*Review by* Mo Huina
Date 2011.12.6	*Date*	*Date* 2011.12.6

IEEE 1725 OTA

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DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	December 6, 2011	First edition

1. General Information

1.1. EUT Description

EUT Type ..... :	EX-05 MILITARY STYLE HEADSET CRISP& DEEP WIRELESS STEREO HEADPHONES
Serial No..... :	(n.a, marked #1 by test site)
Hardware Version ..... :	N/A
Software Version ..... :	N/A
Applicant ..... :	Goodbetterbest Limited Suites 103-107 Devonshire Business Centre Works Road Letchworth Herts SG6 1GJ United Kingdom
Manufacturer ..... :	Goodbetterbest Limited Suites 103-107 Devonshire Business Centre Works Road Letchworth Herts SG6 1GJ United Kingdom
Frequency Range..... :	The frequency range used is 2403MHz - 2477MHz (75 channels, at intervals of 1MHz); The frequency block is 2400MHz to 2483.5MHz.
Modulation Type ..... :	FHSS (GFSK(1Mbps))

Note 1: The EUT is a EX-05 MILITARY STYLE HEADSET CRISP&DEEP WIRELESS STEREO HEADPHONES, the frequencies allocated for the Module is F(MHz)=2400+1*n (3<=n<=77). The lowest, middle, highest channel numbers of the Module used and tested in this report are separately 3 (2403MHz), 40 (2440MHz) and 77 (2477MHz).

Note 2: The EUT is capable of MIMO operation, it supports two transmit chains.

Note 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.2. Test Standards and Results

The objective of the report is to perform testing according to FCC Part 15 Paragraph 15.249 (Operation within the bands 2400- 2483.5MHz) for the EUT FCC ID Certification:

Test	Test Requirement	Test Method	Class/ Severity	Result
Radiated Emission (30MHz to 25GHz)	FCC PART 15: 2009	ANSI C63.4: 2009	Class B	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2009	ANSI C63.4: 2009	Class B	N/A

1.3. Facilities and Accreditations

1.3.1. Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at 3/F, Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22; the FCC registration number is 741109.

1.3.2. Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

2. Conducted Emission

The test is not applicable, because the EUT is not switched, contains no switches, does not include inductive loads.

3. Radiated Emission

3.1.1. Requirement

The radiated emission tests were performed in the 3m Semi-Anechoic Chamber, the EUT complied with the FCC Part 15 Paragraph 15.249 standards.

The specification used in this report was the FCC Part 15 Paragraph 15.249 and FCC Paragraph 15.209 (a) limits, except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

A. FCC Part 15 subpart C Paragraph 15.249 Limit

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBμV/m	μV/m	dBμV/m
902- 928 MHz	50	94	500	54
2400- 2483.5 MHz	50	94	500	54
5725- 5875 MHz	50	94	500	54
24.0- 24.25GHz	250	108	2500	68

Note: (1). RF Voltage(dB μ V)= 20 log RF Voltage(μ V)

(2). Distance refers to the distance in meters between the measuring instrument antenna and the Closed point of any part of the device or system.

(3). The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

(4). Limit fundamental is 94dB μ V/m@3m(AV) and 114 dB μ V/m@3m(PK)

Limit field strength of harmonics: 54 dB μ V/m@3m(AV) and 74 dB μ V/m@3m(PK).

B. Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)	Field Strength Limitation at 3m Measurement Dist
0.009 - 0.490	2400/F(kHz)	300	20log 2400/F(KHz) + 80
0.490 - 1.705	24000/F(kHz)	30	20log 2400/F(KHz) + 40
1.705 - 30.0	30	30	20log 30 + 40
30 - 88	100	3	20log 100
88 - 216	150	3	20log 150
216 - 960	200	3	20log 200
Above 960	500	3	20log 500

Note:

1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a

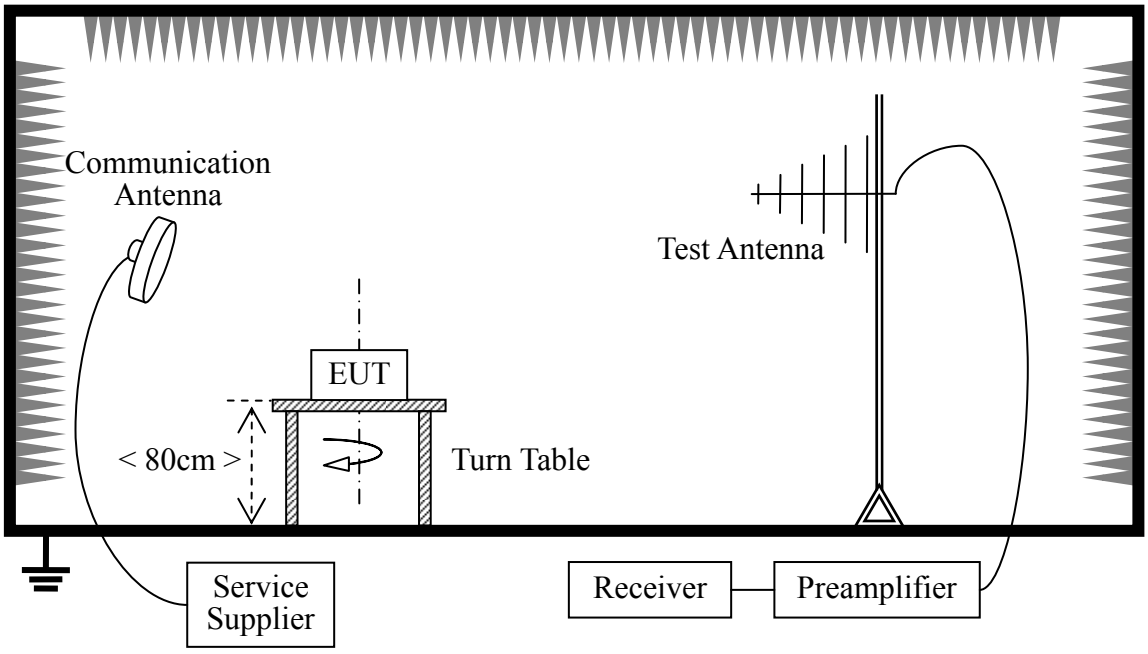
peak detector function, corresponding to 20dB above the maximum permitted average limit.

2. For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

3.1.2. Test Description

A. Test Setup:



The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2009). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4.

The Module of the EUT is powered by the Battery. The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the Module is set to operate under hopping-on test mode transmitting at maximum power.

For the Test Antenna:

(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. The emission levels at both horizontal and vertical polarizations should be tested.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	R&S	CMU200	100448	2011.05	1year
Receiver	Agilent	E7405A	US44210471	2011.05	1year
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2011.05	2year
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2011.05	1year
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2011.05	1year
Test Antenna - circular	R&S	AC004R1	0749.3000.03	2011.05	1year

3.1.3. Test Result

According to ANSI C63.4 selection 4.2.2, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$E\ [dB\mu V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

A_{Factor}: Antenna Factor at 3m

During the test, the total correction Factor AT and A_{Factor} were built in test software.

3.1.3.1. GFSK Mode:

A. Test Verdict for Harmonics:

The Fundamental Emissions

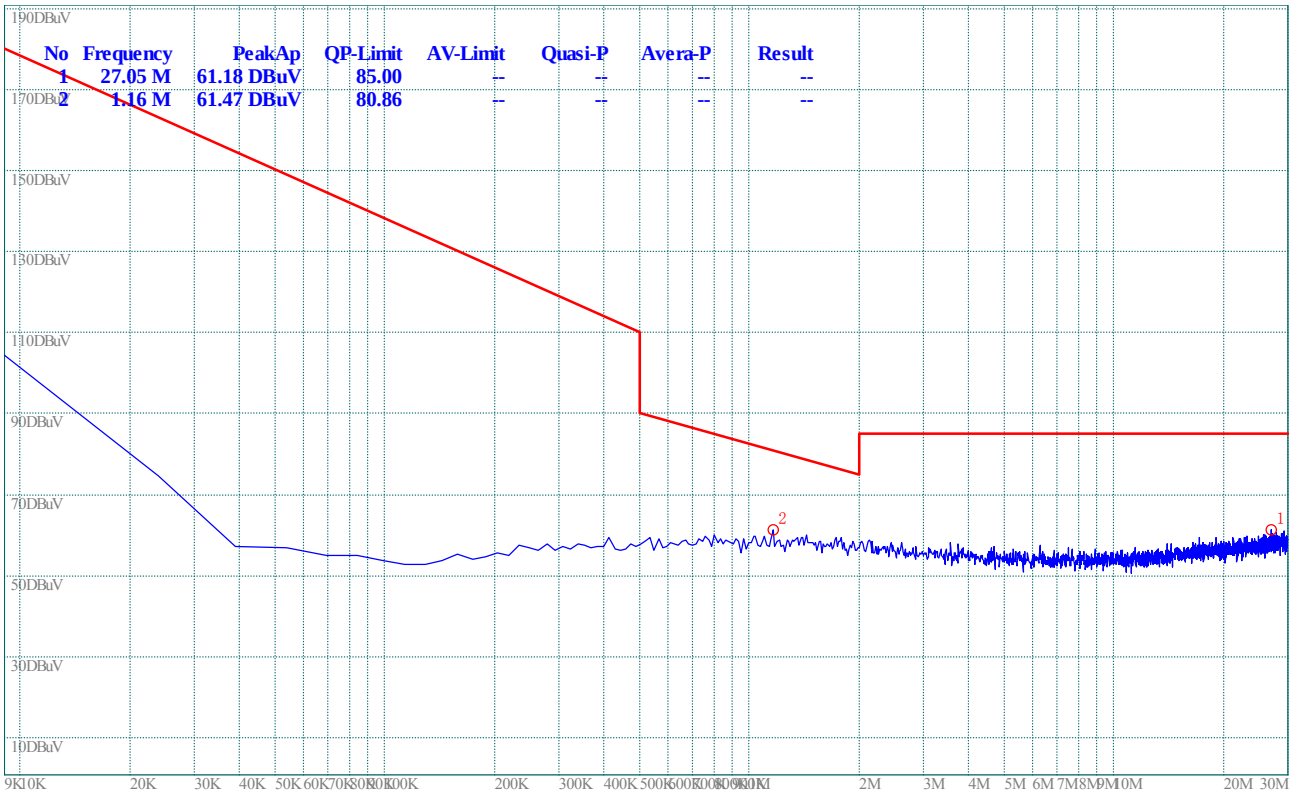
The field strength of {Fundamental Emission} listed below is recorded, and used in the next table.

Frequency (MHz)	Fundamental Emission (dBμV/m)		Antenna Polarization	Limit (dBμV/m)		Verdict	Refer to Plot
	PK	AV		PK	AV		
2403	84.95	---	Horizontal	114.00	94.00	PASS	Plot A.1
	86.94	---	Vertical	114.00	94.00	PASS	Plot A.2
2440	86.93	---	Horizontal	114.00	94.00	PASS	Plot B.1
	86.66	---	Vertical	114.00	94.00	PASS	Plot B.2
2477	82.41	---	Horizontal	114.00	94.00	PASS	Plot C.1
	86.35	---	Vertical	114.00	94.00	PASS	Plot C.2

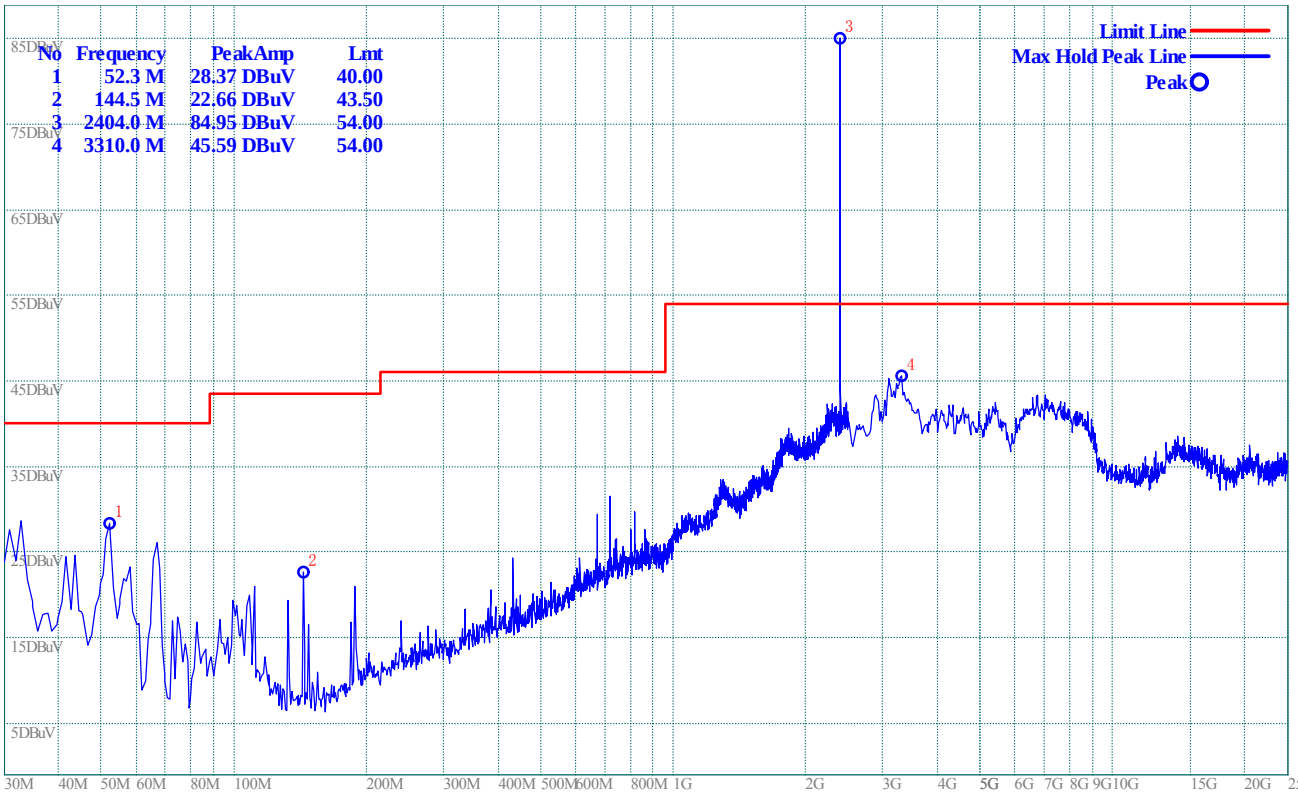
Note: "---" in the table above means that the emissions are too small to be measured and are at least 10dB below the limit.

B. Test results and test Plots for the Whole Measurement Frequency Range:

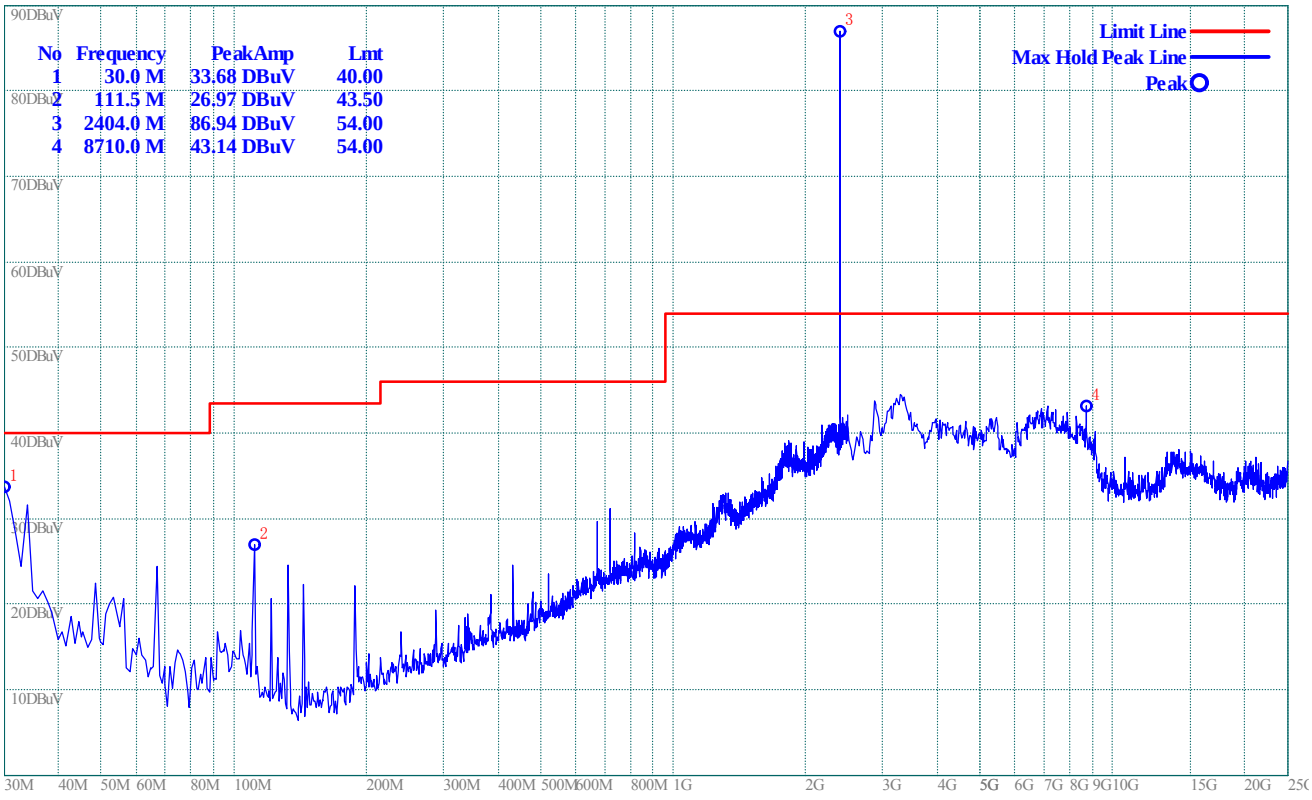
Plots for Channel = 3



(Plot A.0: 9kHz to 30MHz @ GFSK, channel 3)

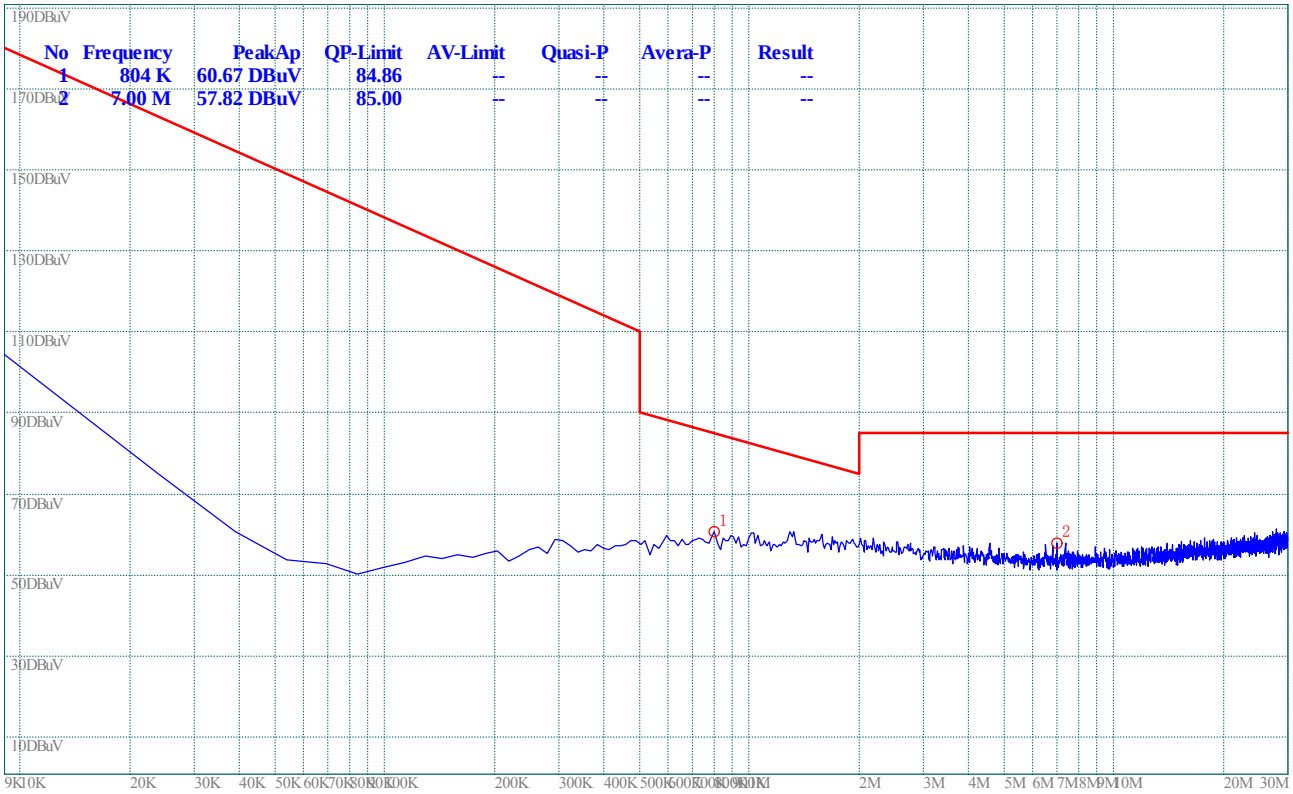


(Plot A.1: 30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 3)

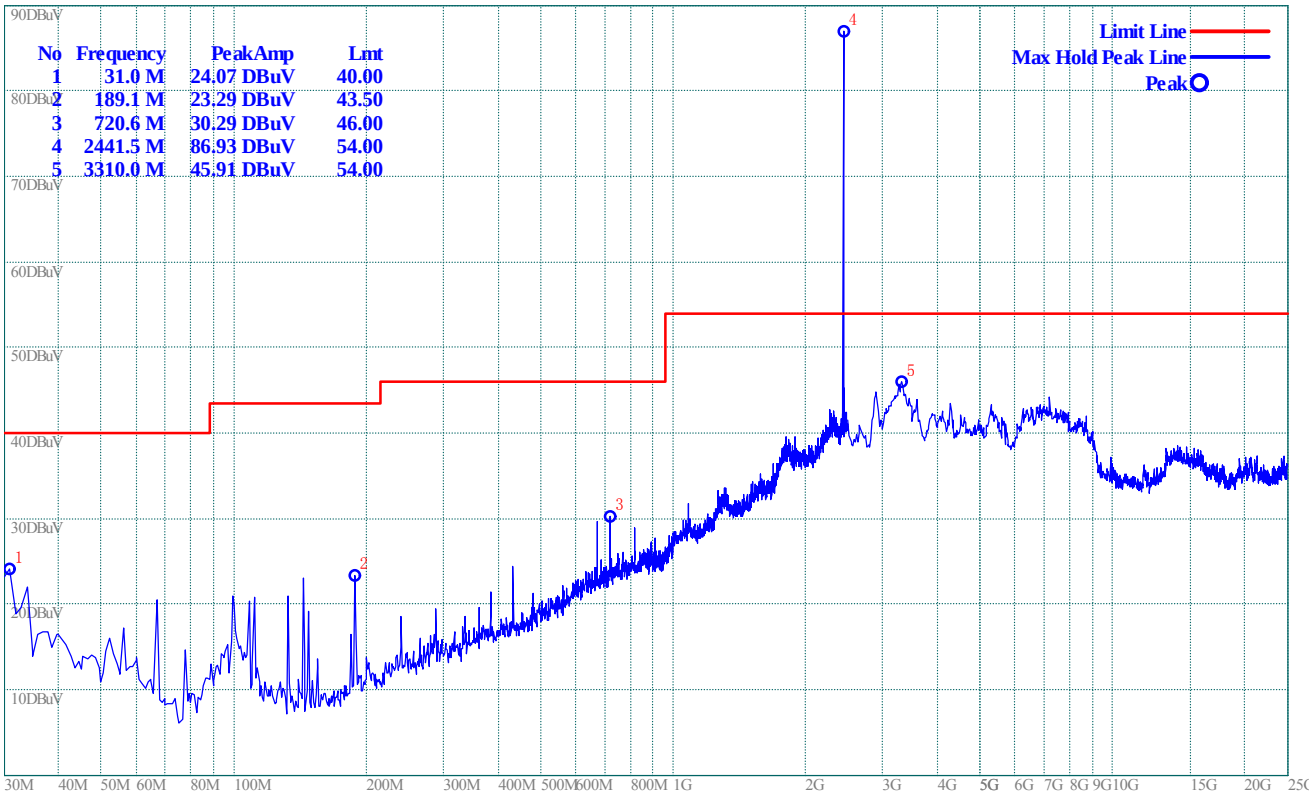


(Plot A.2: 30MHz to 25GHz, Antenna Vertical @ GFSK, channel 3)

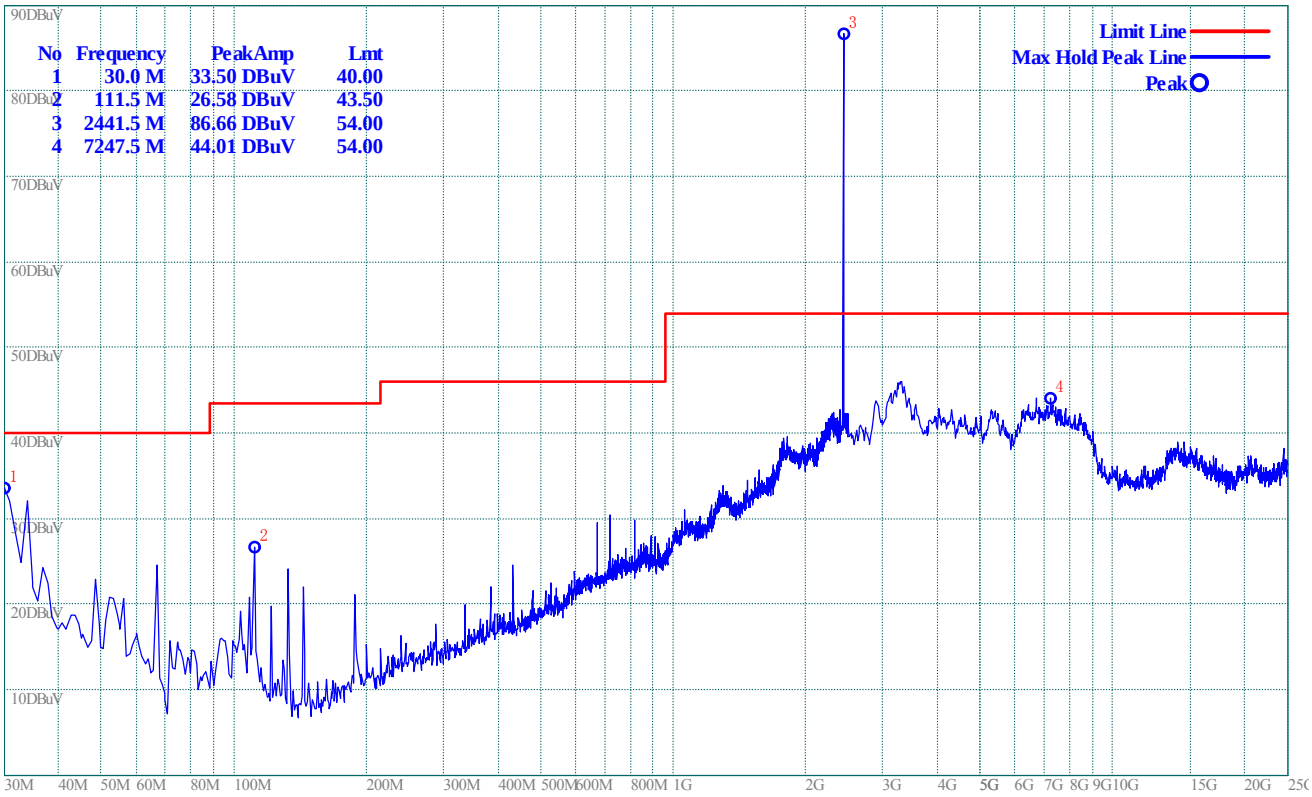
Plot for Channel = 40



(Plot B.0: 9kHz to 30MHz @ GFSK, channel 40)

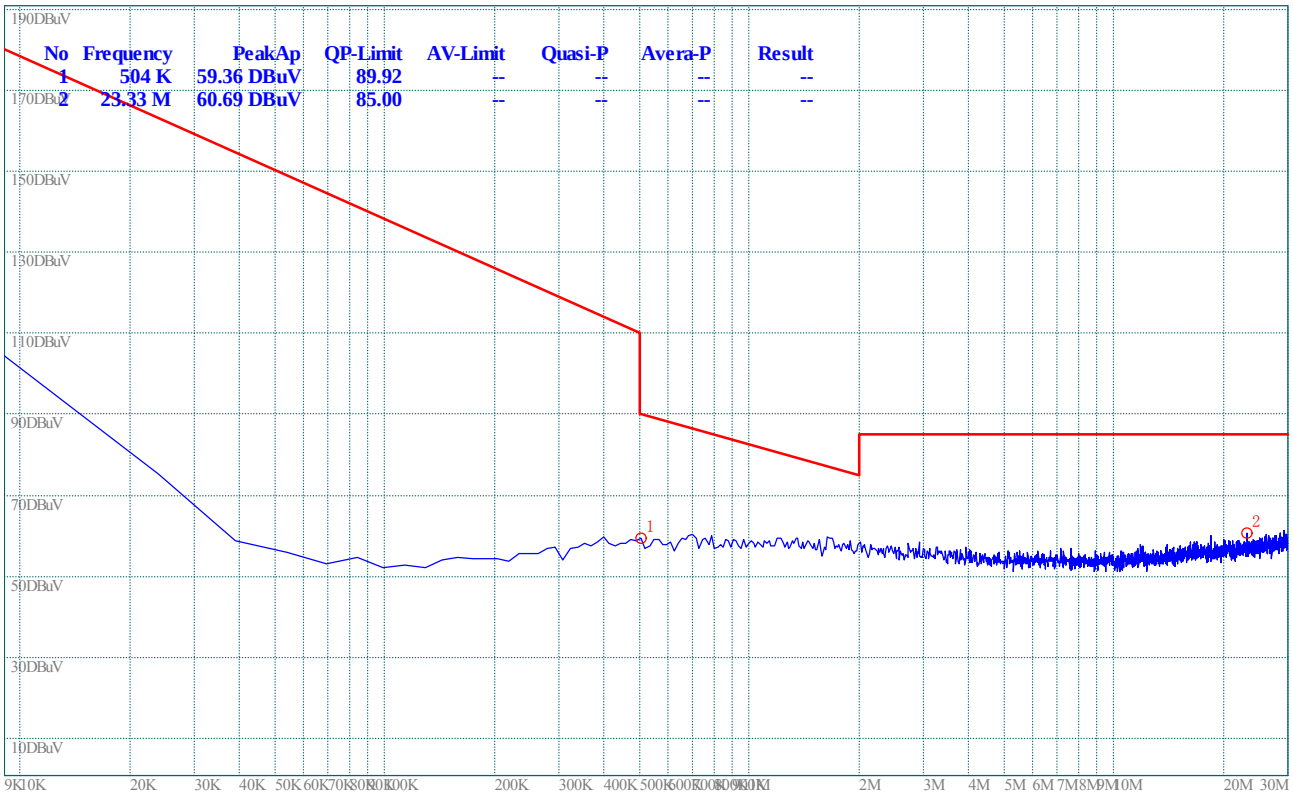


(Plot B.1: 30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 40)

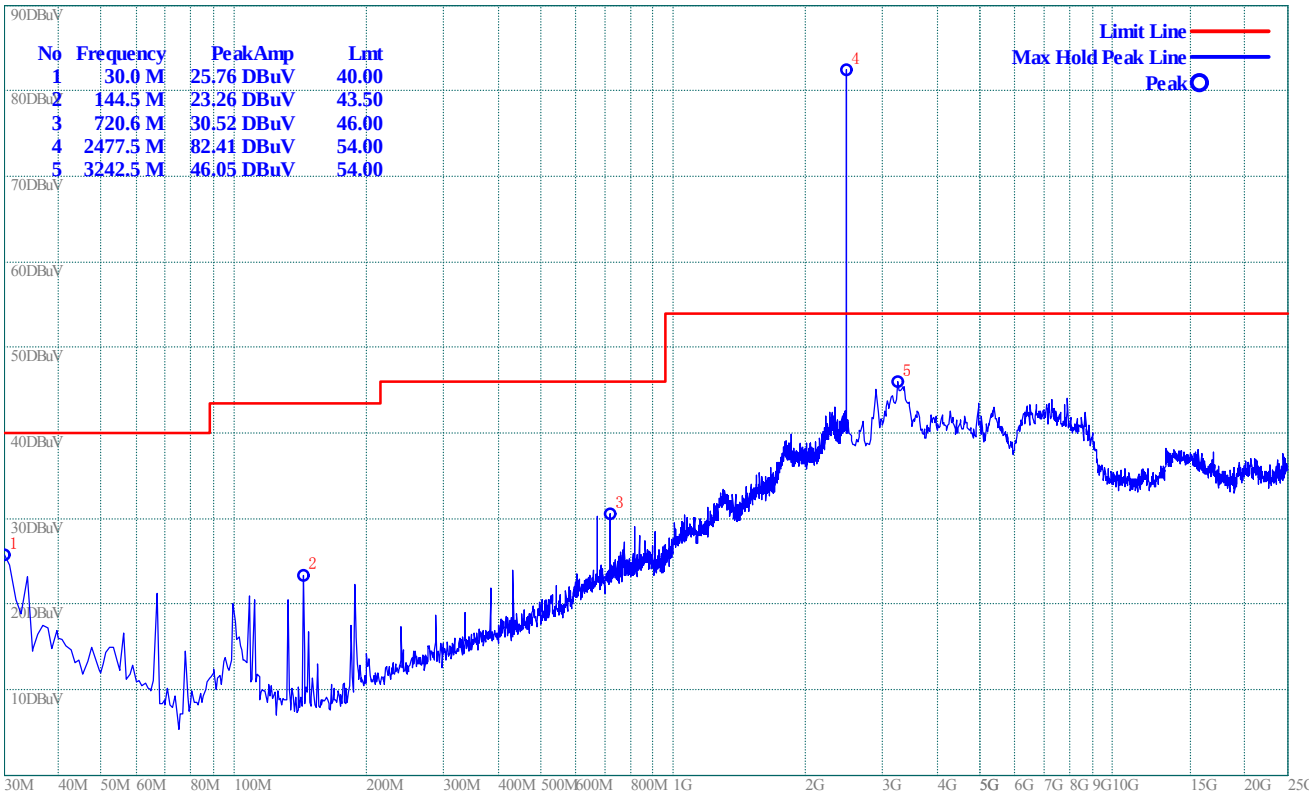


(Plot B.2: 30MHz to 25GHz, Antenna Vertical @ GFSK, channel 40)

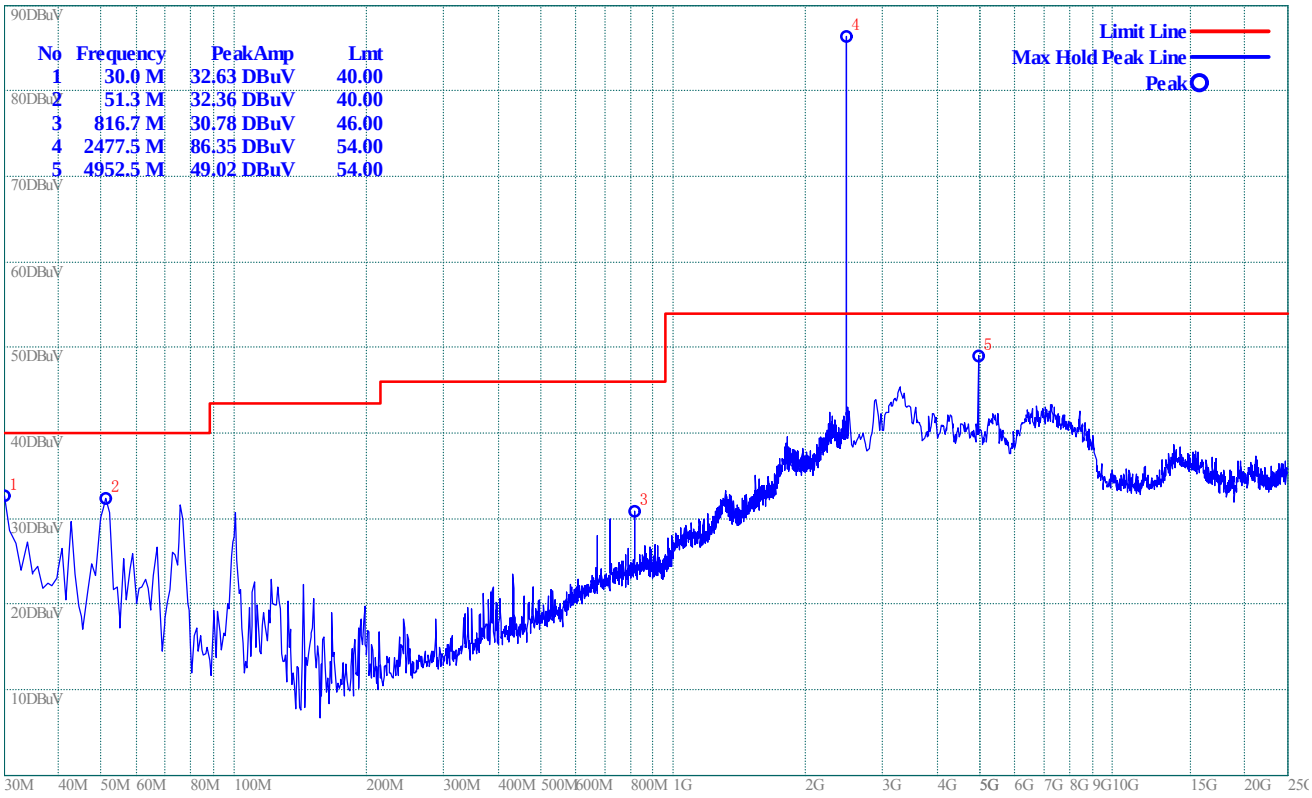
Plot for Channel = 77



(Plot C.0: 9kHz to 30MHz @ GFSK, channel 77)



(Plot C.1: 30MHz to 25GHz, Antenna Horizontal @ GFSK, channel 77)



(Plot C.2: 30MHz to 25GHz, Antenna Vertical @ GFSK, channel 77)

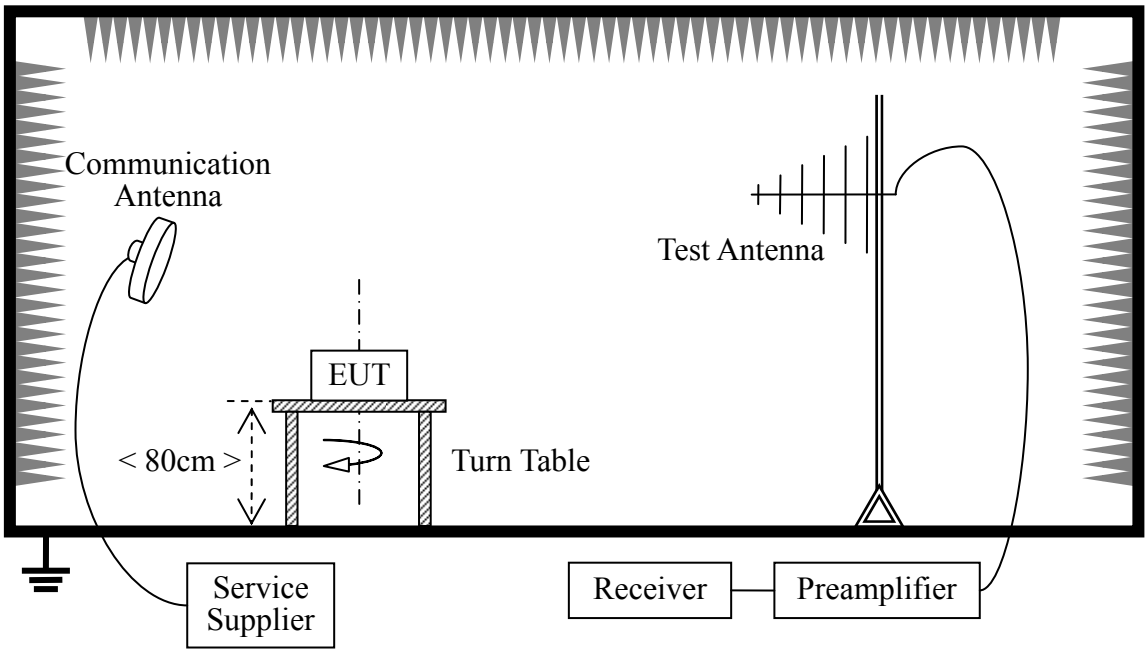
4. Band Edge

4.1.1. Requirement

According to FCC section 15.249(d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in FCC section 15.209.

4.1.2. Test Description

A. Test Setup:



The EUT is powered by the Battery. The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the Module is set to operate under hopping-on test mode transmitting at maximum power.

For the Test Antenna:

Horn Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	R&S	CMU200	100448	2011.05	1year
Receiver	Agilent	E7405A	US44210471	2011.05	1year
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2011.05	2year
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2011.05	1year

4.1.3. Test Result

The Bluetooth Module operates at hopping-off test mode. The lowest and highest channels are tested to verify the band edge emissions.

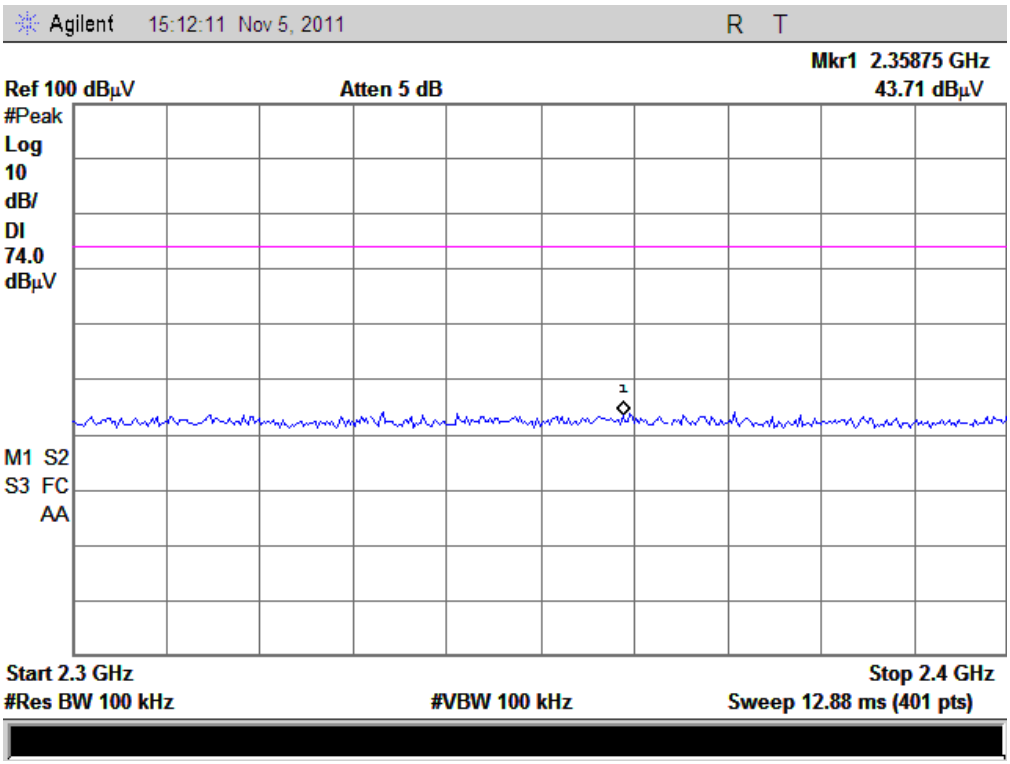
The measurement results are obtained as below:
E [dBμV/m] =U_R + A_T + A_{Factor} [dB]; A_T =$L_{Cable\ loss}$ [dB]-G_{preamp} [dB]
A_T: Total correction Factor except Antenna
U_R: Receiver Reading
G_{preamp}: Preamplifier Gain
A_{Factor}: Antenna Factor at 3m

4.1.3.1. GFSK Mode

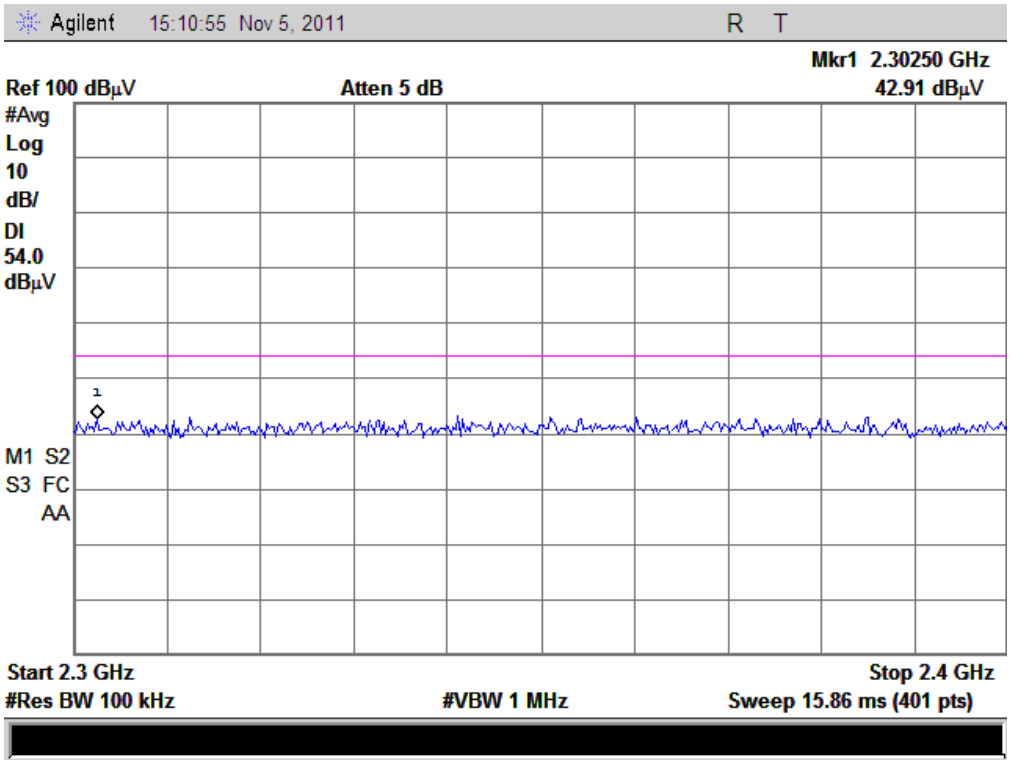
A. Test Verdict:

Channel	Frequency (MHz)	Receiver Reading U_R (dBuV)		A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)		Limit (dBμV/m)		Verdict
		PK	AV			PK	AV	PK	AV	
3	2403	43.71	42.91	-30.93	32.56	45.34	44.54	74	54	PASS
77	2477	43.77	42.77	-29.05	32.5	47.22	46.22	74	54	PASS

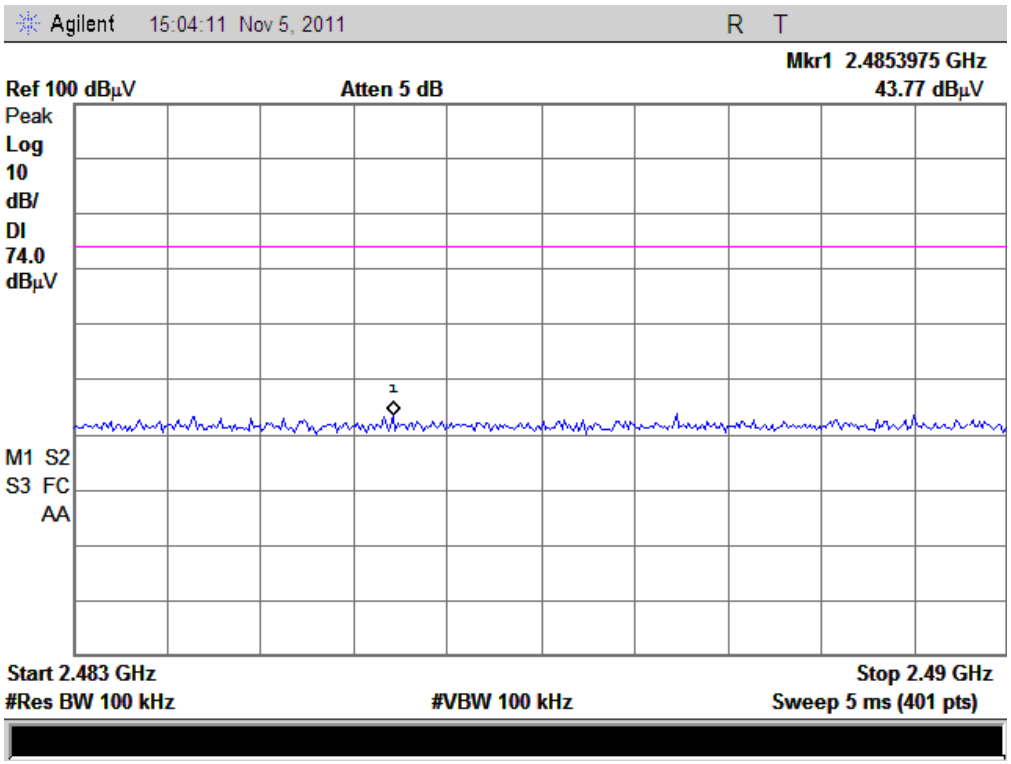
B. Test Plots:



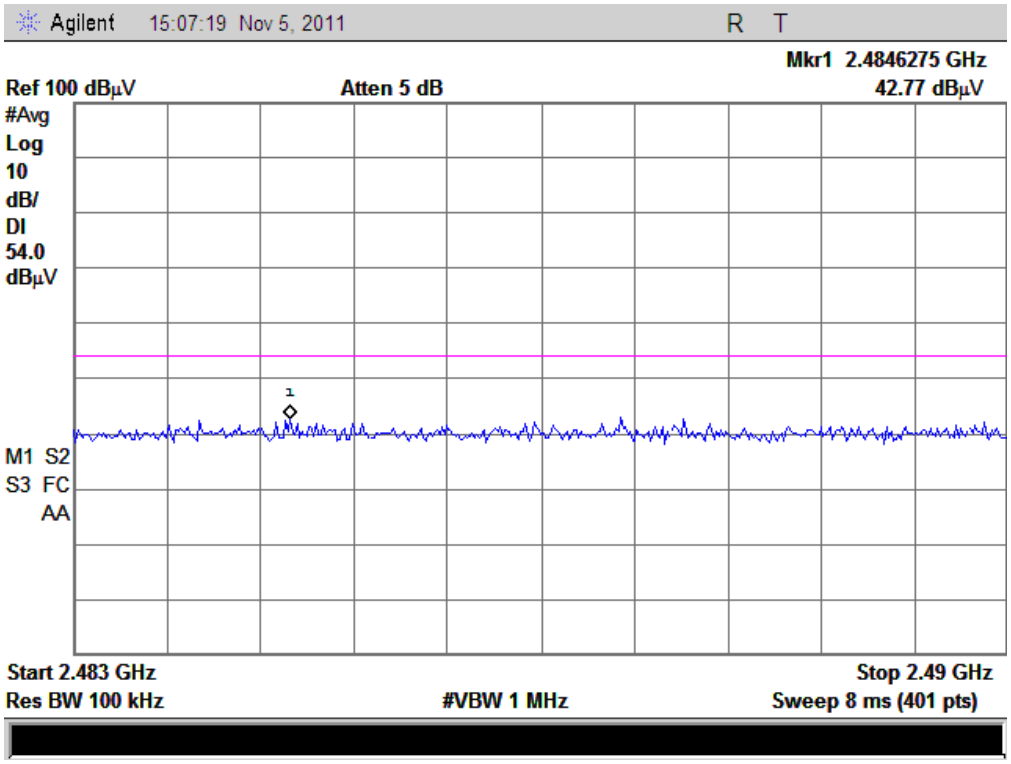
(Plot A1: Channel = 3 PEAK @ GFSK)



(Plot A2: Channel = 3 AVERAGE @ GFSK)



(Plot B1: Channel = 77 PEAK @ GFSK)



(Plot B2: Channel = 77 AVERAGE @ GFSK)

5. 20dB Bandwidth

5.1.1. Definition

The 20dB bandwidth is defined as the total spectrum the power of which is higher than the peak power 20dB.

5.1.2. Test Description

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below:

5.1.3. Test Result

The Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to record the 20dB bandwidth of the Module.

5.1.3.1. GFSK Mode

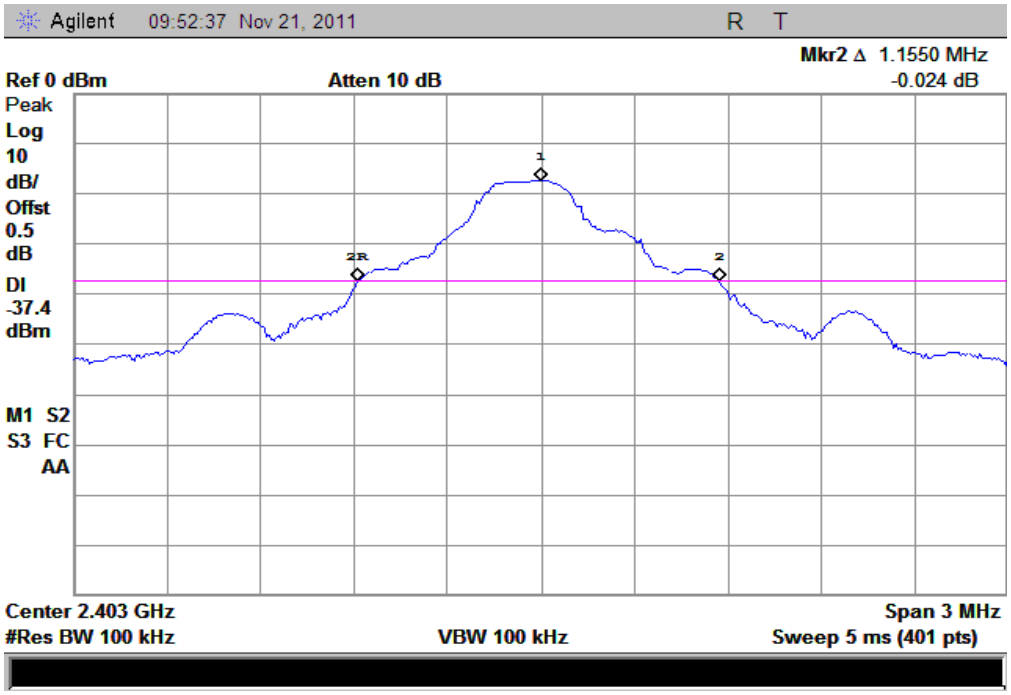
A. Test Verdict:

Chain 1:

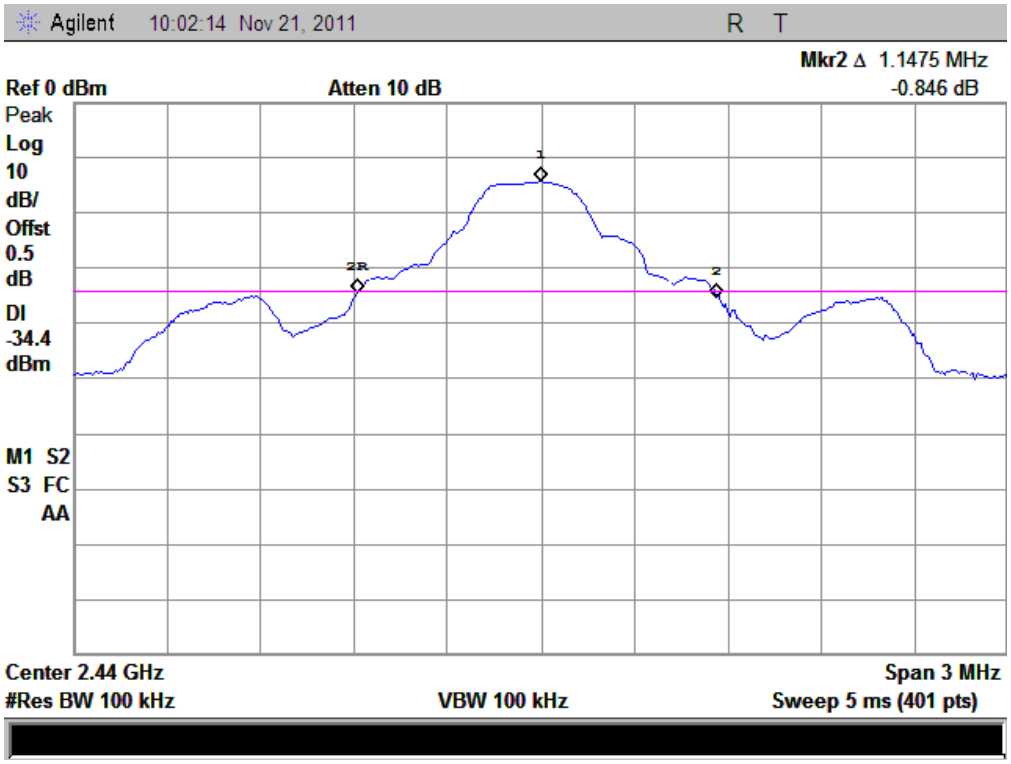
The maximum 20dB bandwidth measured is 1.17MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
3	2403	1.155	Plot A
40	2440	1.1475	Plot B
77	2477	1.17	Plot C

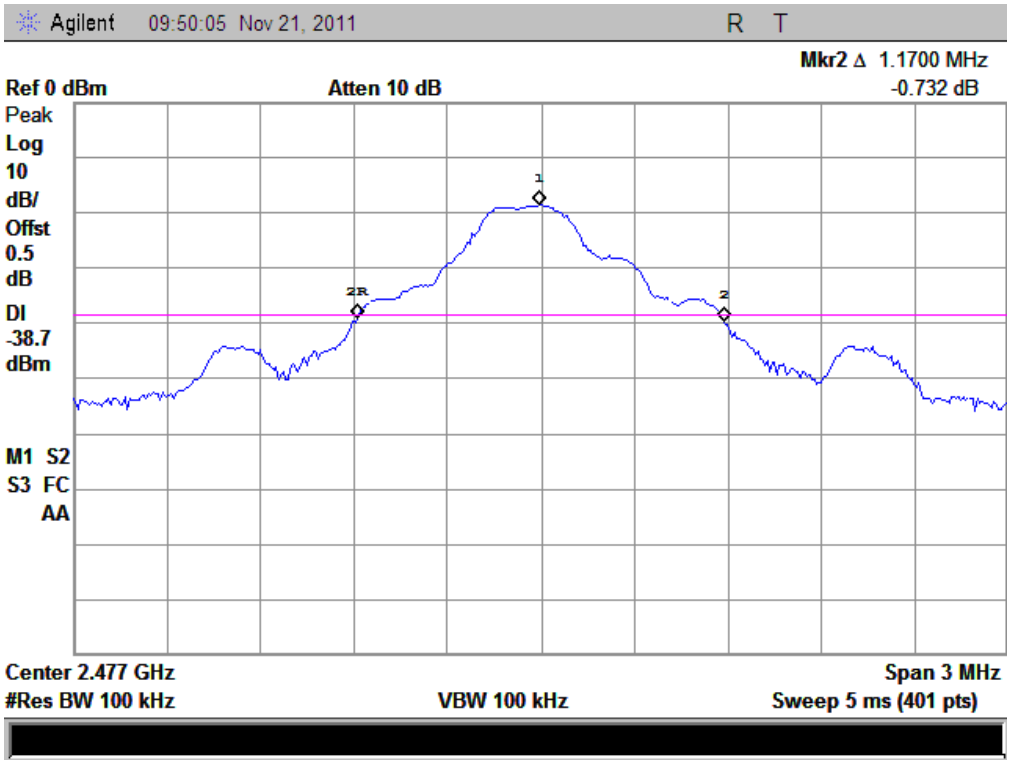
B. Test Plots:



(Plot A: Channel = 2403 @ GFSK)



(Plot B: Channel = 2440 @ GFSK)



(Plot C: Channel = 2477 @ GFSK)

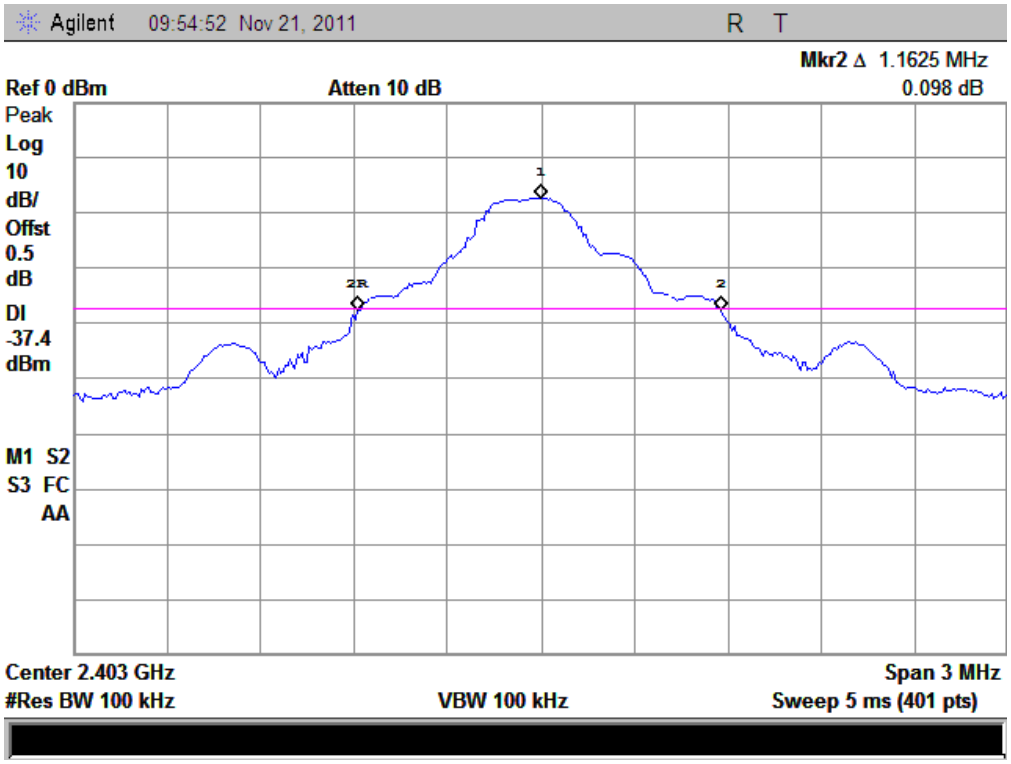
Chain 2:

C. Test Verdict:

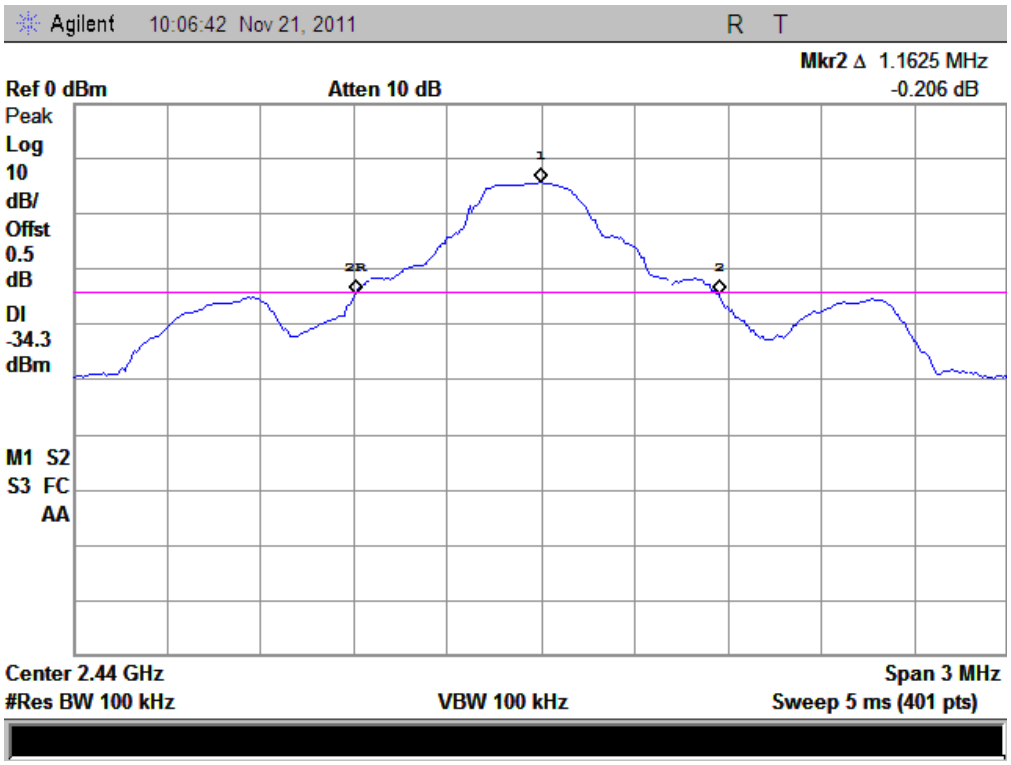
The maximum 20dB bandwidth measured is 1.1775MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
3	2403	1.1625	Plot D
40	2440	1.1625	Plot E
77	2477	1.1775	Plot F

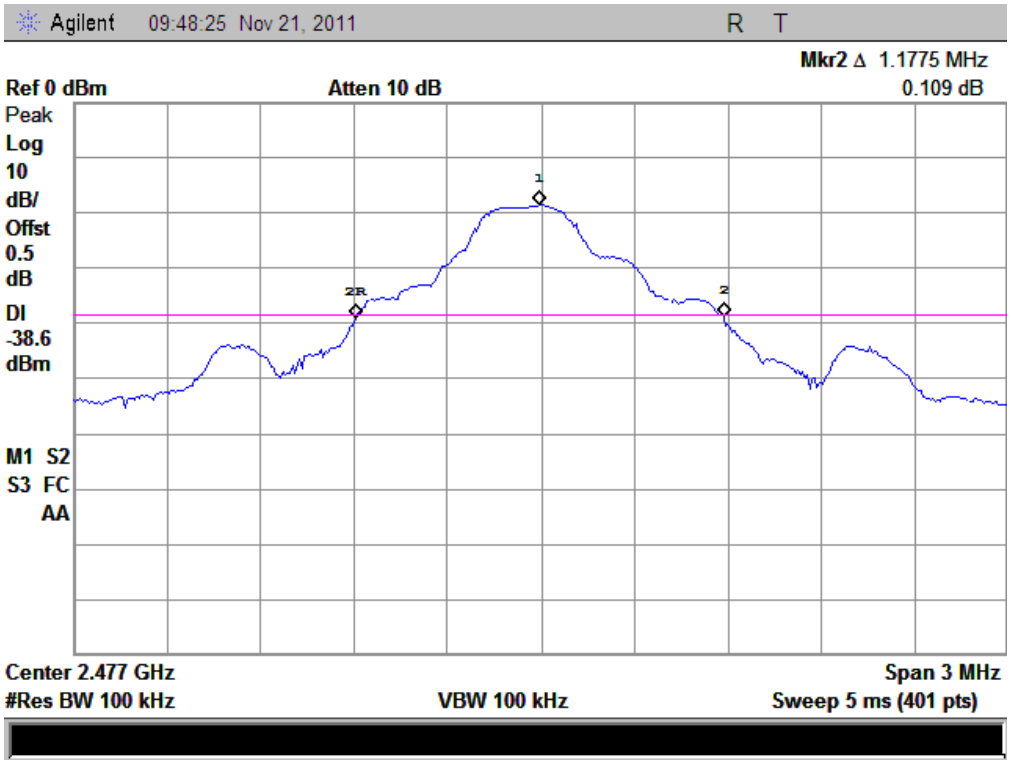
D. Test Plots:



(Plot D: Channel = 2403 @ GFSK)



(Plot E: Channel = 2440 @ GFSK)



(Plot F: Channel = 2477 @ GFSK)

** END OF REPORT **